Uni-Line®
Product Knowledge

Thermostats

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Thermostat Control

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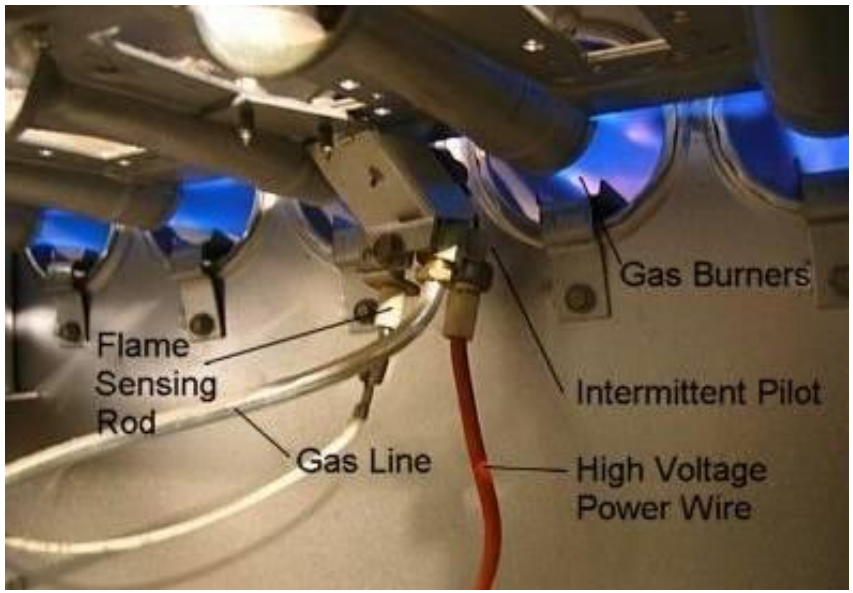
Thermostat Training Topics

- Short Cycle Delay
- Remote Sensors
- Time of Day Zoning
- Residual Fan
- Intermittent Fan
- Staging
- Humidity Controls
- Differentials
- Balance Point
- Fossil Fuel and Heat Pump
- Enthalpy
- Product Line & Features
- Manufacturer Analysis
- Troubleshooting

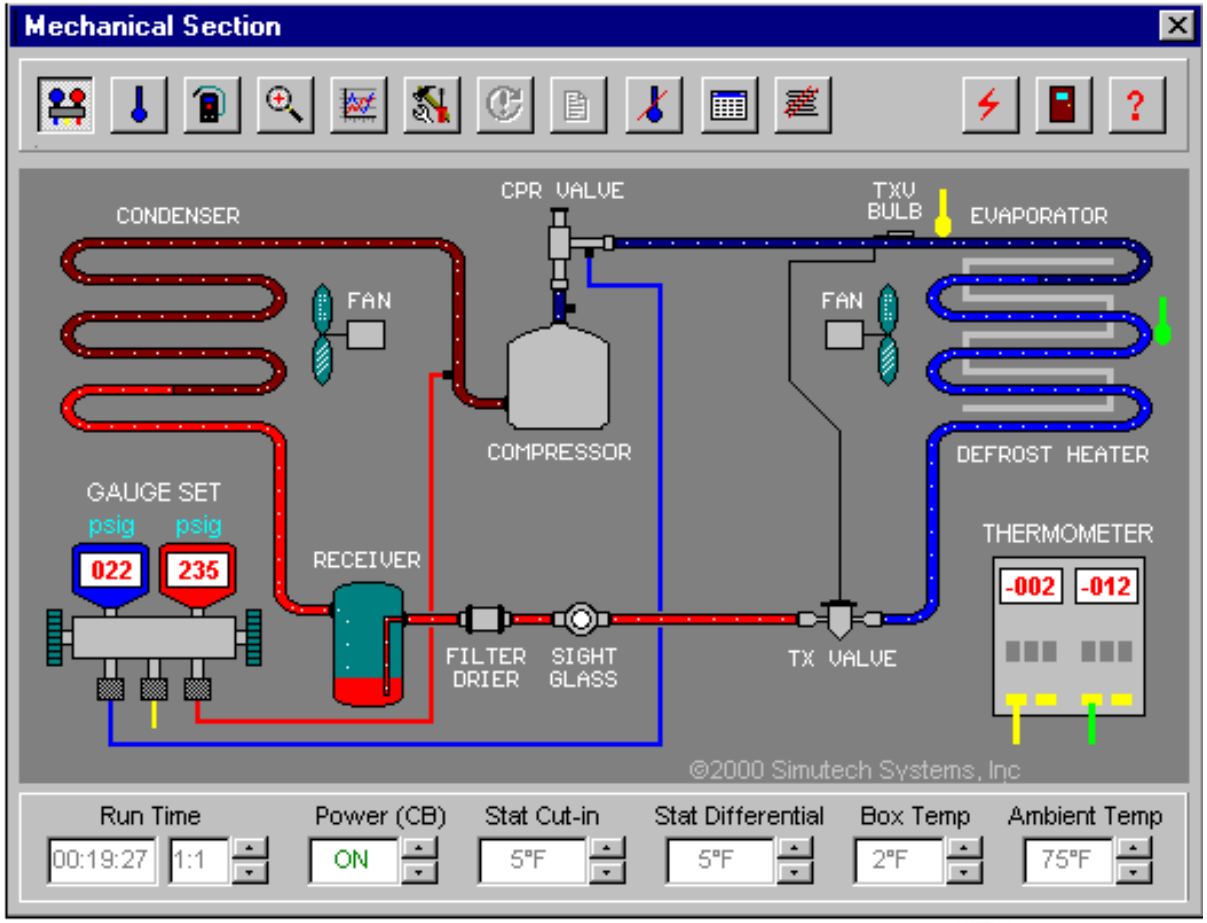
HVAC - Heating

- W1 = 1st stage Heating
- W2 = 2nd Stage Heating
- E = Emergency Heating
- Aux = Auxiliary Heating
- Y = Heat pump Heating
- G = Fan



HVAC – Air Conditioning

- Cooling Air Conditioning System Components
  - Condenser
  - Evaporator
  - Compressor
  - TXV
  - Blower motor
  - Heater
  - Receiver
  - Drier
  - Fan



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Terms & Definitions

- **Anticipation** – the activation or deactivation in advance of ambient temperature reaching set point
- **Energy Efficient Recovery** – thermostat to initiate heating or cooling in advance of the time the air temperature at the thermostat would normally cause the thermostat to initiate
- **Auto Changeover** – the provision for automatically changing from heating to cooling mode or vice versa
- **Call for Heating or Cooling** – industry speak for “request”
- **Cycle rate** – number of cycles per hour
- **HP** – heat pump
- **Radio Frequency (RF)** – Radiating electrical energy oscillating between 3kHz to 300GHz
- **Wi-Fi** – wirelessly connecting electronic devices usually for Internet access. Standard is often referred to as IEEE 802.11

Short Cycle Delay

- Protection of compressor to reduce excessive cycling
- Adjustable 0 to 5 minute short cycle delay
  - Usually 1 minute increments
- Applied after call for compressor is deactivated
- Used for minimum off time
- Not needed by some systems
- Feature may be provided by another control

Remote Sensors

- Protection of compressor to reduce excessive cycling
- Remote sensors sense temperature in different spaces
  - Outside
  - Inside
- Sensors serve as control points and information source
- Remote sensors are used in Time of Day Zoning

Remote location

Master bedroom or hallway

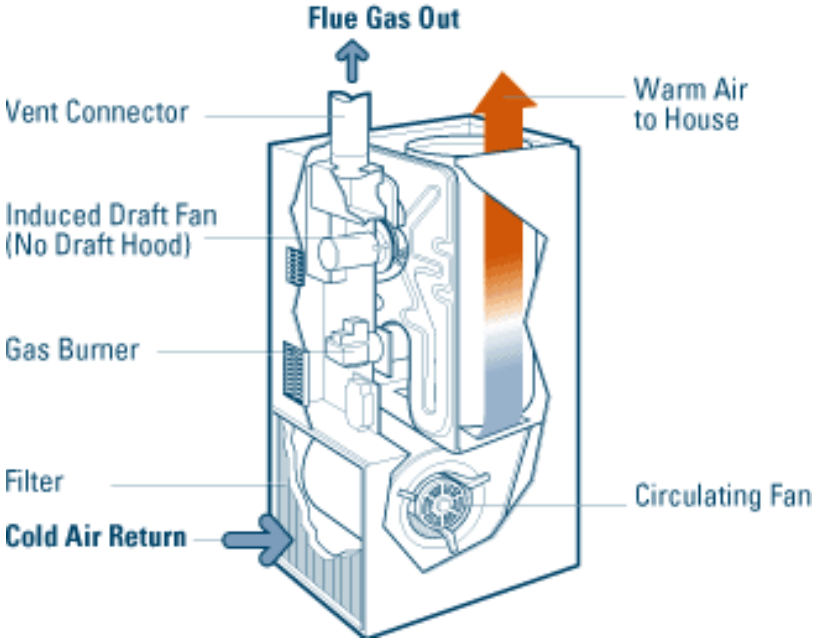
9020i for Indoor Sensor
9025i for Outdoor Sensor

Time of Day Zoning

- Time of Day Zoning allows user to prioritize the temperature in a room during a selected event
- Depends on Rooms:
  - Upstairs vs. Downstairs
  - Basement
  - Living Room
  - Bedrooms
- Depends on Events:
  - Wake
  - Day
  - Evening
  - Sleep
- For example, user wants heat in bedroom during wake event, regardless of temperature needs for other areas

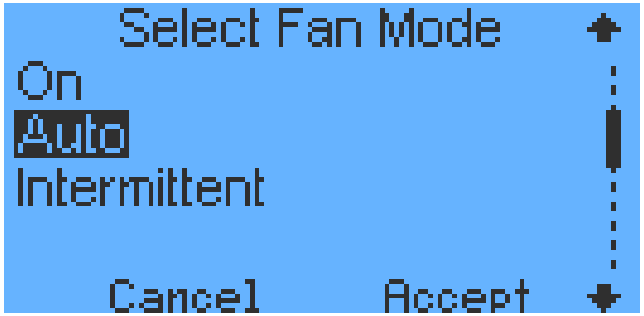
Current Energy Control – Fan Control

- Conventional Heat Pump
  - No control at air handler
  - Thermostat controlled
- Gas Furnace
  - Plenum switch
  - Electronic furnace control
  - Furnace controlled
- Electric Furnace
  - No control at air handler
  - Thermostat controlled
- Dual Fuel
  - Standard is Manufacturer dependant
  - Add-on is Furnace controlled
- MilliVolt
  - Typically no fan installed



Fan Modes

- Typical fan selections are:
  - On
  - Auto
  - Intermittent



- **On** provides 24 / 7 continuous fan activated
- **Auto** provides fan when air handler is on in heat or cool mode
- **Intermittent** provides ability to operate in predetermined cycles
- The fan can also be programmed to run continuously during a specified event or scheduled period

Current Energy Control - Advantages of Fan Modes

- Advantages of *Intermittent* Fan
  - Improve comfort with constant moving air
  - Less cost due to less compressor run time
  - For example, on 10 minutes, off 20 minutes

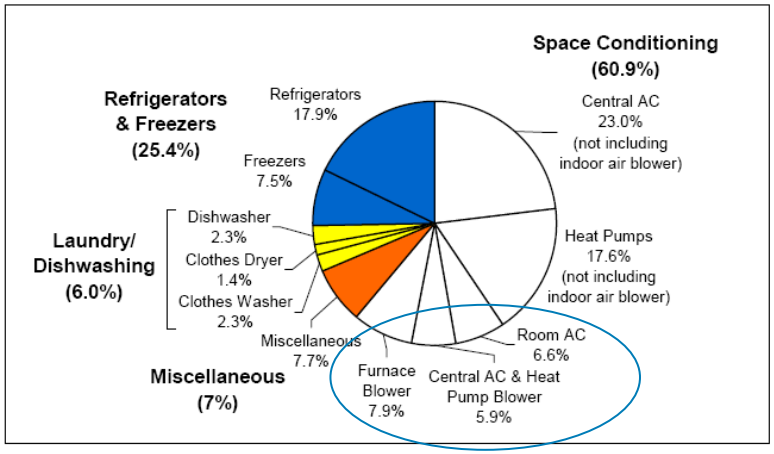
- Advantages of *Continuous* Fan
  - Increased comfort
  - Continuous fan life of 5 years
    - Replacement cost is low
    - Continuous run: (24 hrs/day, 8760 hrs/year)

Current Energy Control – Fan Features

Residual Fan

- Applied to forced air systems only
- Allows fan to run after a call for either heating or cooling
  - Pulls built up HVAC heat or cool into living space
- Maximum extended fan run time is 120 seconds
  - Selections include Off, 30, 60, 90 or 120 seconds
- Used more frequently as residual cooling
  - A/C does not control air handler
  - Not recommended in humid climates
- Heating used on much older systems or heat pumps

Typical Home Energy Usage



- Continuous Fan is minimal kWh usage
- Energy saving on Furnace Blower is worth monetary savings
- Opportunities to Save Energy:
  - Zoning
  - Indoor Air Quality
  - Variable Speed (ECM) Motors

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Staging

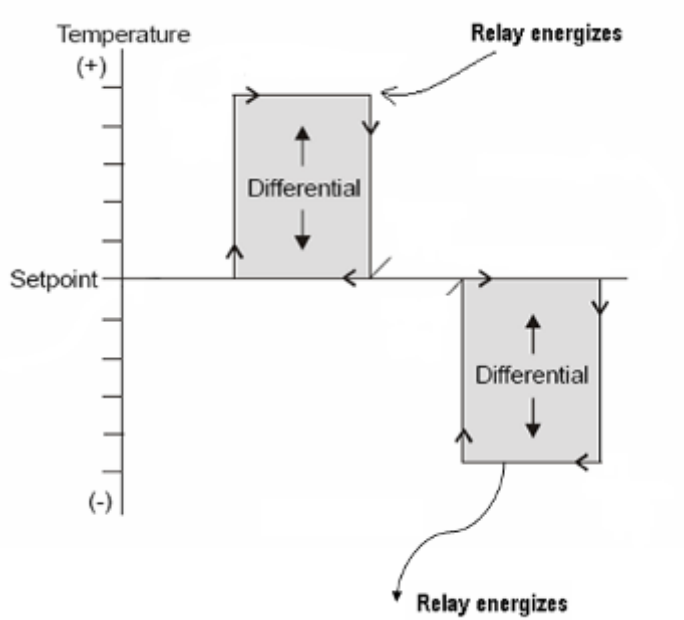
- Staging is a control feature where a higher or lower power consumption level of heating or cooling is enabled
- Staging can be automatic or manual
- W1 is typically considered 1st stage of Heating
- W2 is typically considered 2nd stage
- Upstaging will occur if the current stage output BTUH of the system is not sufficient to meet the needs of the user
- Staging also occurs in Zone systems automatically when the number of zone calls exceeds a preset value

Humidity Control

- Humidity adds moisture to the air during a heat call
- Dry air can cause dry skin and discomfort
- Adding humidity makes the air more comfortable
- The latent heat in the moisture can add heat allowing the user to run thermostat at more efficient settings
- Adding too much moisture during very cold outdoor temperatures can cause condensation on windows
- To prevent condensation the thermostat can automatically disable the humidity below a programmed temperature set point

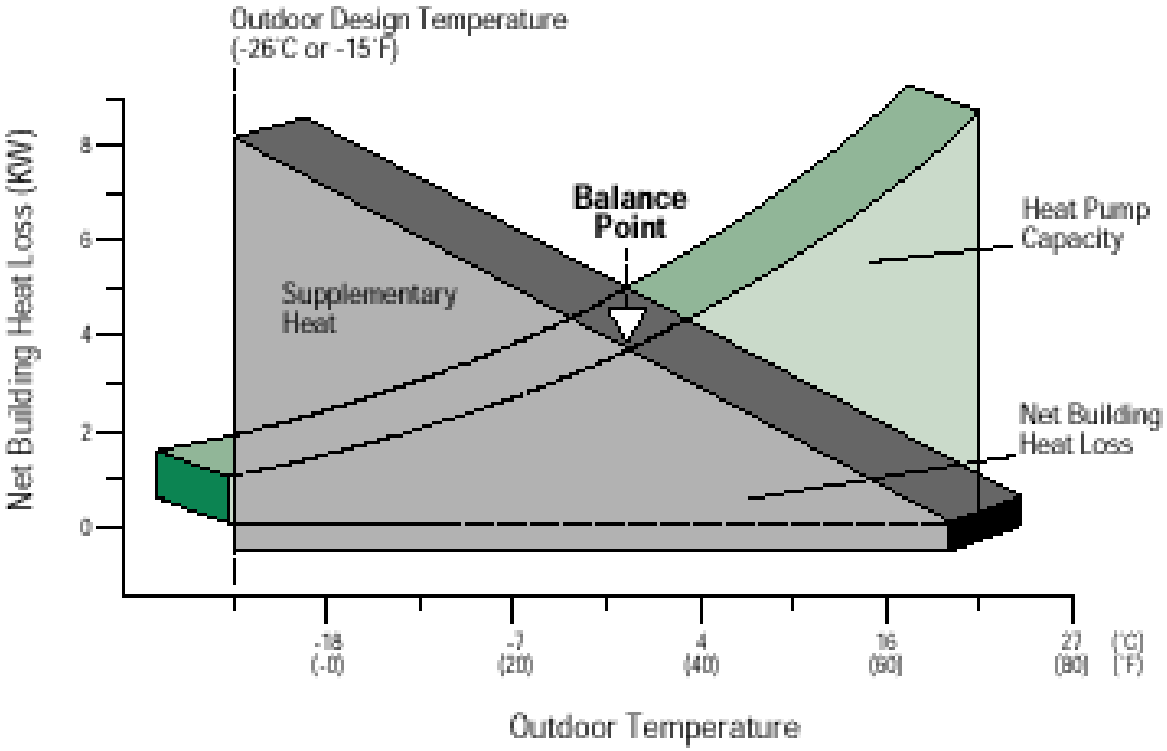
Differential Settings

- Differential is the difference between the set point and the maximum allowed deviation from set point before the system calls for Heating or Cooling
- Differentials are usually between 1 and 8 degrees F



Balance Point

- Balance Point control is used to turn OFF inefficient equipment and turn ON more efficient equipment

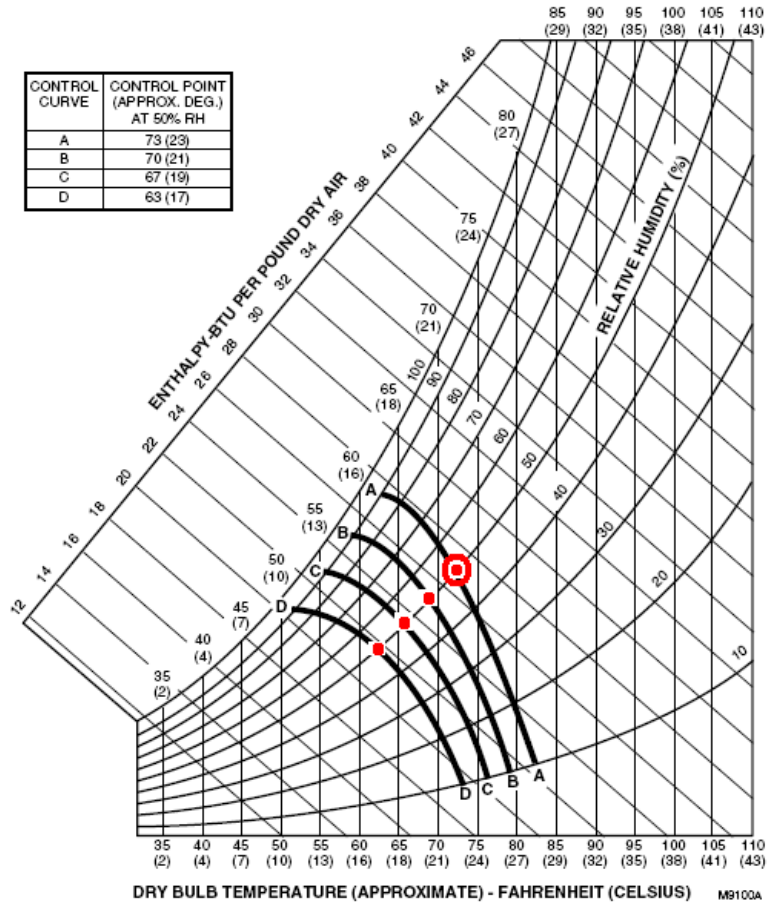


Enthalpy Control

- **Enthalpy -** Total amount of heat in one pound of substance calculated from accepted temperature base, expressed in BTUs per pound mass
- **Enthalpy of Dry Air** - Sensible heat
- **Enthalpy of Evaporated Water** - Latent heat
- **Psychometric Chart -** Chart which has the properties of air under varying conditions of temperature, water vapor content, and volume
- **Specific Heat -** Amount of heat necessary to change the temperature of one pound of a substance 1° F
- **Specific Enthalpy** - *h* - (kJ/kg) Defined as the total enthalpy of the dry air and the water vapor mixture per kilogram of moist air
- **Dry Bulb Temperature** - Temperature read with an ordinary thermometer

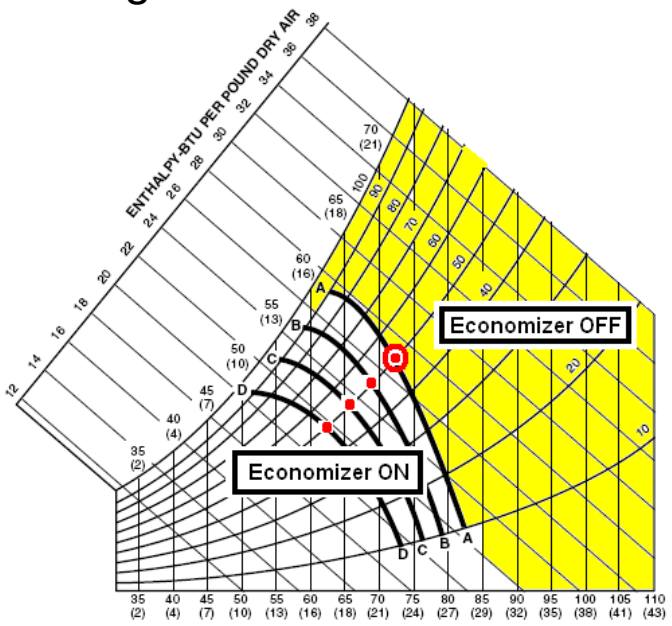
Enthalpy Control

CONTROL CURVE	CONTROL POINT (APPROX. DEG.) AT 50% RH
A	73 (23)
B	70 (21)
C	67 (19)
D	63 (17)



Performance characteristics for enthalpy changeover settings A,B,C and D.

Enthalpy Changeover Setpoint
The A,B,C,D enthalpy setpoints adjust enthalpy changeover characteristics. The “A” setting provides the greatest energy savings.



Thermostat Types

- Mechanical
- Electronic

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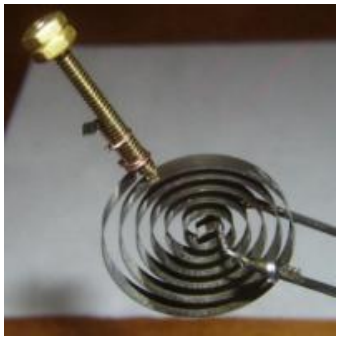
Thermostat Types

Mechanical Thermostats



- Bi-metal thermometer
  - Strip of two different metals (iron and copper)
  - Each metal has a different response to temperature
  - Different response causes strip to change position
- Mechanical switching mechanism
  - Mercury
  - Reed Relay

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Thermostat Types

Digital Non-Programmable

- Equivalent to mechanical thermostat
- Solid-state operation
  - No mechanical wear
  - Elimination of expensive metals
- Can contain “Advanced” features not possible on mechanical thermostats
  - Two setpoints (Heating and Cooling)
  - Auto changeover

Thermostat Types

Digital Programmable

- Adds ON/OFF schedules
- Reduces energy use when comfort is not critical
- Normally 4 periods per day
  - Morning
  - Day
  - Evening
  - Night

Remote Sensors

- Offers ability to sense temperature in locations away from thermostat
  - Outside
  - Other indoor spaces (such as bedroom)
- Sensors can be used for information or as control points
- Sensor info can be used to activate damper systems

Remote location

Master room or hallway

Wireless Thermostats

RF

ZIGBEE®

WI-FI

RUBEE®

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Wireless Advantages

- Improves ease of retrofit
- Adds flexibility
- Reduces cost of multiple zone management
- Enables remote support

Radio Frequency (RF)

Pros

- Long Distance
- Industry History

Cons

- Higher frequencies require higher power consumption
- Interference concerns

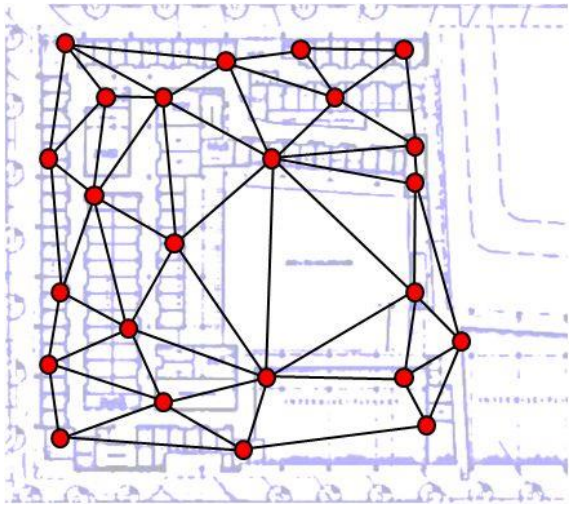
ZigBee®

Pros

- Self discovering
- Long distance
- Mesh Network

Cons

- Power requirements high
- Infrastructure can be costly



Mesh Network

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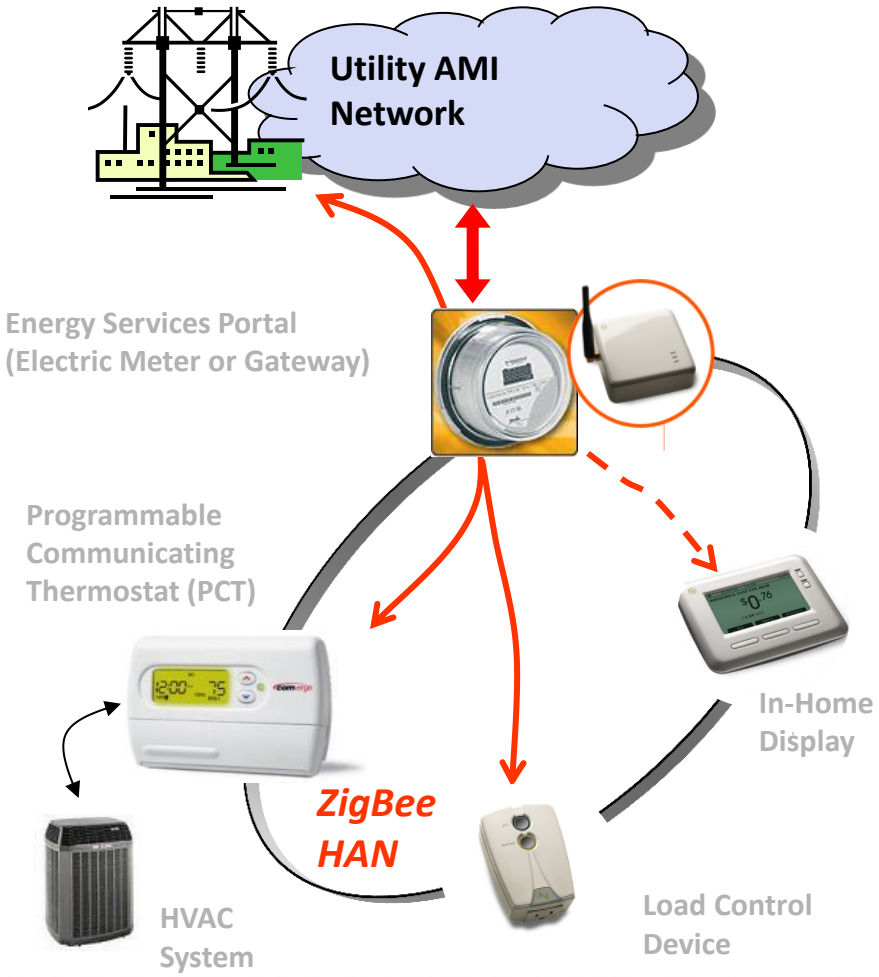
How ZigBee Smart Energy Works



1. Devices join utility network
2. Demand Response events
   - Consumer can opt ‘in’ or ‘out’
3. Load Control events
4. Pricing messages
   - Unsecured to any device

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Wi-Fi

Pros

- Cost
- Industry Standard
- Internet Connectivity

Cons

- Security
- Interference Concerns

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Pros

- Less interference
- Less power
- Packet based
- IEEE 1902.1

Cons

- Limited distance
- Slower communication speed

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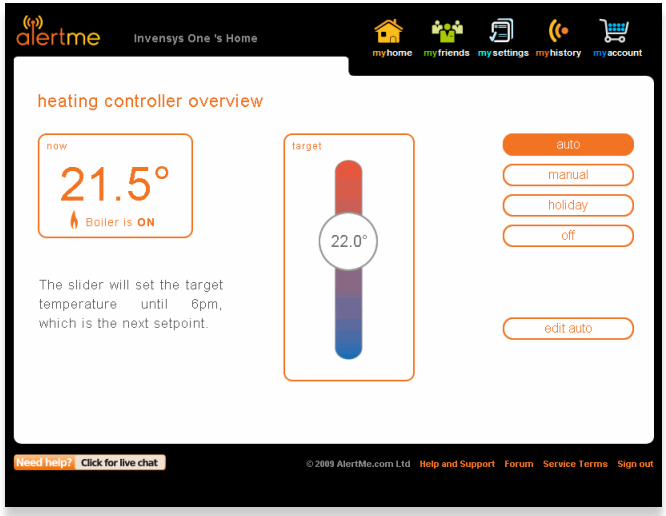
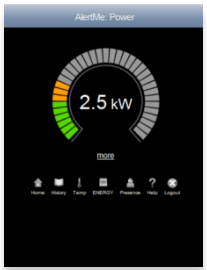
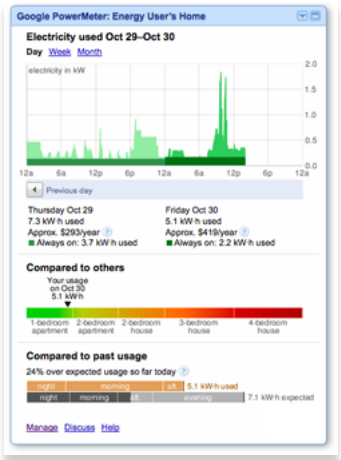
Example Infrastructure



Controller web page
for PC/Mac and smartphone



At-a-glance energy usage
on iPhone



Integration Google
with powermeter

Internet

Thermostat

wireless

wireless

wireless

Meter reader

Smart Plug

Internet hub to wireless gateway

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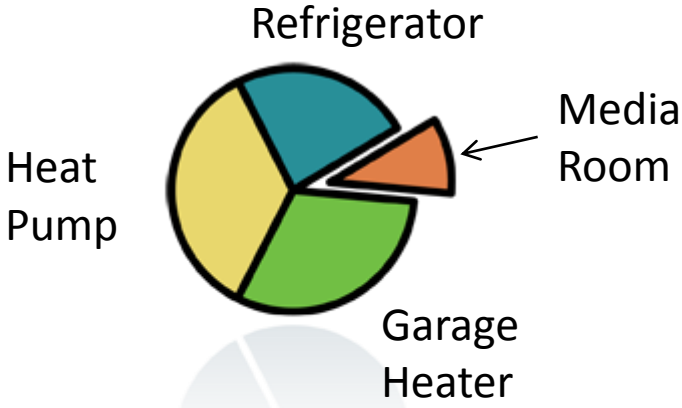
Electrical Panel Monitoring

- Advanced systems monitor power usage by circuit
- Creates energy profiles
- Can help identify problem appliances and sources early



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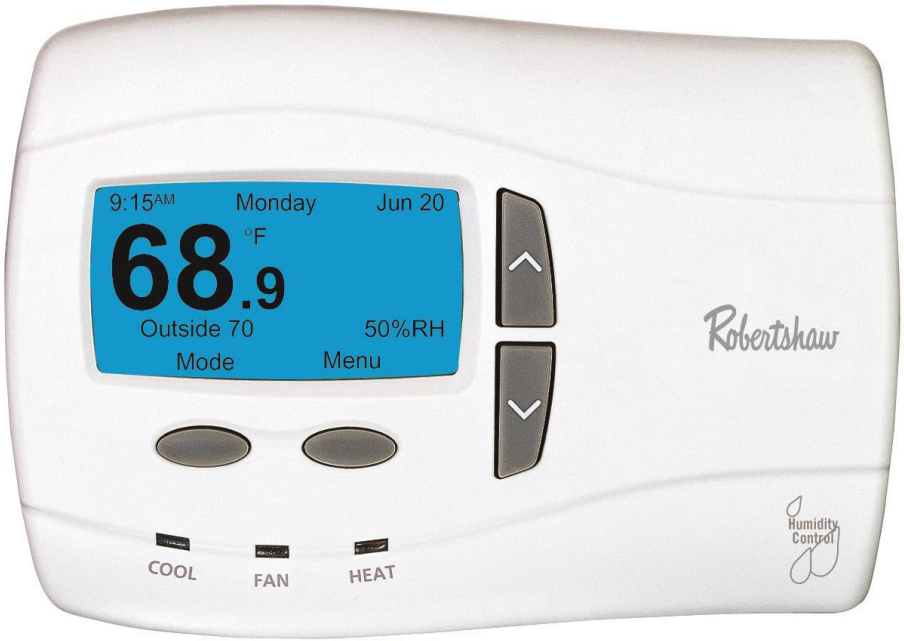
Monitoring And Control

- Wall Units
- Internet
- Smart Phone



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Technology Trends

Technology

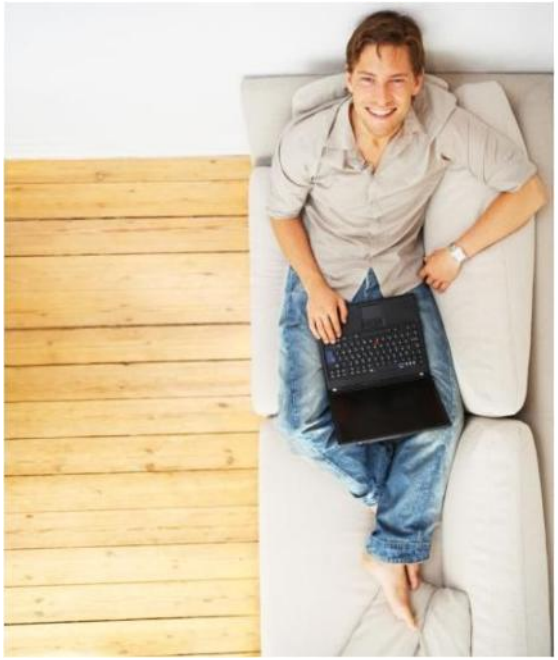
- Open protocols (ZigBee®, Wi-Fi, etc.)
- Smart-grid integrated controls
- Adaptive predictive controls algorithms
- Touch-screen interactive controls

Systems

- Control/optimise multiple energy sources

Customer Requirements

- Desire to be “green”
- Desire to reduce energy costs
- Aesthetics increasingly important
- Expect connectivity and interoperability



Internet Monitoring And Control

- Ability to monitor remotely
- Ability to control remotely

Smart Phone Monitoring & Control

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Trends in Smart Grid

- Monitoring
- Tariff / rate flexibility
- Control

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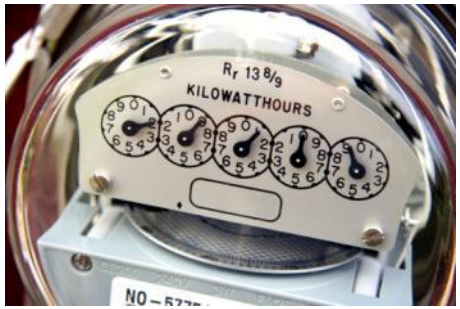
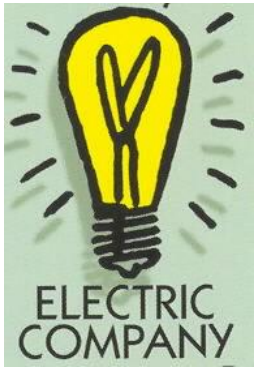
Monitoring

- Simplify meter reading
- Enhance data collection efficiency
- Reduce manpower costs





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Tariff And Rate Flexibility

- Differences in rates based on usage and time of day
- Rate flexibility depends on total usage
- Rate incentives for utility control of energy usage

Control

- Complete energy control by utility or municipality
- Better distribution of energy resources
- More reliable supply overall

What's Next For Innovation?

- From creators of Apple's iPod - next generation thermostats

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Energy Star

- Launched in 1990 by U.S. EPA
- Originally targeted power plants in attempt to lower energy consumption and greenhouse gas emissions
- Expanded to label appliances that used 20 – 30% less energy than average
- Originally used on programmable thermostats that had setback capability
- Thermostat use discontinued in 2010 due to change in definition

Energy Aware

- New designation to identify products that contribute to energy conservation
- Replacement term for products previously labeled Energy Star
- Identifies products that increase energy efficiency without sacrificing performance

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PRODUCT LINE OVERVIEW

Thermostat Series – Product Overview

Robertshaw® i2 Deluxe Series — Best

- Setup Wizard in multi-languages (English, Spanish and French)
- Humidity Control
- Independent remote and outdoor sensor terminals

Robertshaw RS 4000/5000/6000 Value Series — Better

- Pop-up Configuration Wizard
- Auto Changeover
- Circulating Fan

Robertshaw RS 2000/3000 Economy Series — Good

- Adjustable Temperature Differential
- Worry-Free Memory Retention
- Low Temperature Freeze Protection
- Filter reminder

9400 & 9600 Series — Legacy

- Legacy product offering limited due to micro-processor discontinuance

12 DELUXE SERIES

WALL THERMOSTAT

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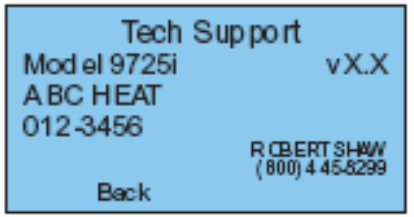
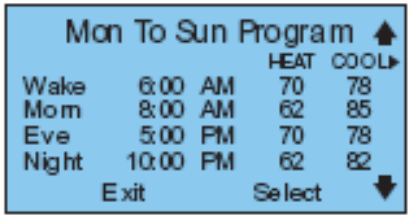
Thermostat Features for i2 Series

Contractor ID Feature
Set your name and phone number in the display to remind customers to call you for service.



Conversational Menus
Take the programming step by step in plain, easy to understand language.



Fully Programmable
Incorporates the most flexible programming options in one device to fit all lifestyles – 7 day, 5/2, 5/1/1, or 24 hour.

Worry-Free Memory Storage
Even during a power outage, the thermostat maintains setpoint and programmed parameters.

Deluxe 9800i2 Thermostat Series

Dot Matrix Display

G Gas

E Electric

O Oil

H Heat Pump

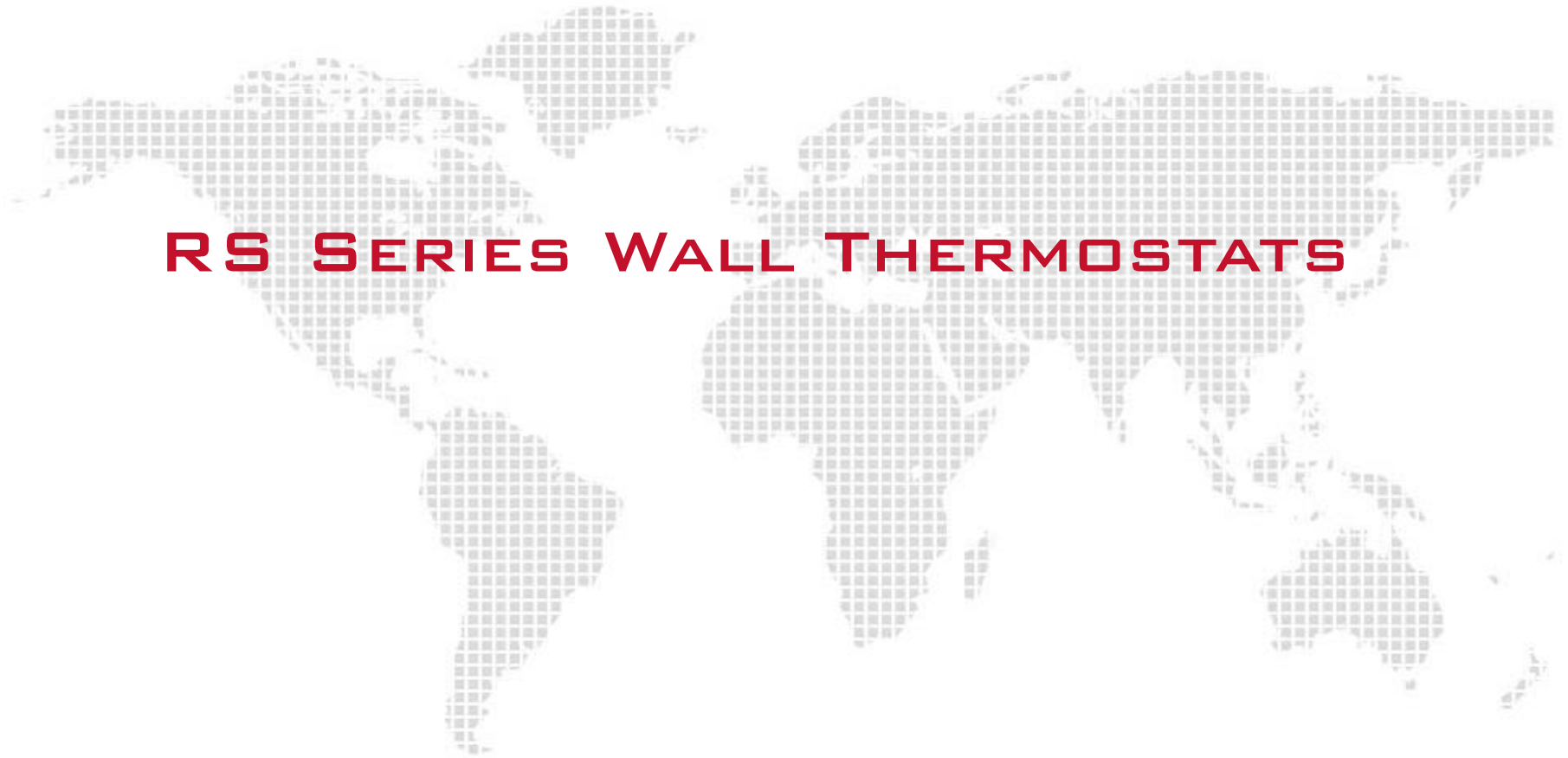
9801i2

- 1 Heat / 1 Cool
- Menu Driven Display
- Set-up Wizard
- Humidity Control
- Temperature override
- 10 minutes to 365 days

9825i2

- Same as above
- 3 Heat / 2 Cool

RS Series Wall Thermostats



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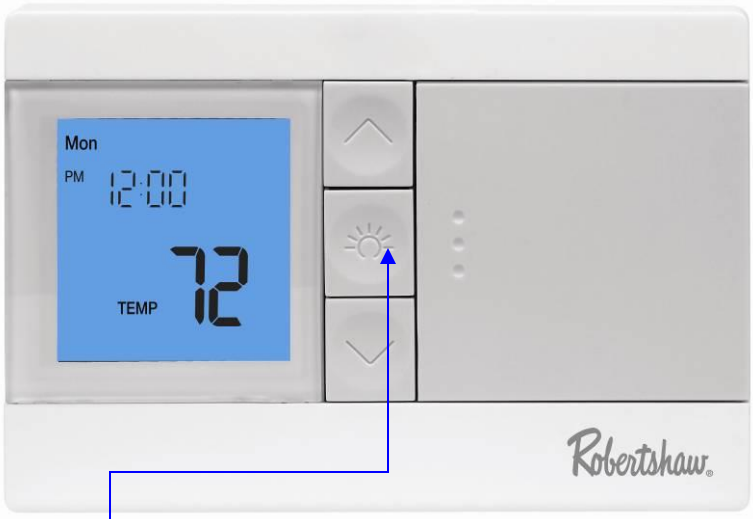
Value and Economy Series Thermostats

- Robertshaw RS 2000/3000 Economy Series
  - Adjustable Temperature Differential
  - Worry-Free Memory Retention
  - Low Temperature Freeze Protection
  - Filter reminder

- Robertshaw RS 4000/5000/6000 Value Series
  - Pop-up Configuration Wizard
  - Auto Changeover
  - Circulating Fan

Robertshaw® RS2000 and RS3000 Economy Series



RS3110

Note the Light symbol. Differentiates RS3110 cover from other Economy series

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Features of RS2000 and RS3000 Series

- Bigger, Brighter Display with blue backlight
- Adjustable Temperature Differential
- Automatic Compressor Short Cycle Protection
- Separate “O” and “B” terminals
- Front Access Battery Compartment
- Two level Low Battery warning
- Filter Change Indicator
- Easy Access Reset
- Automatic Cut-off
- Low temperature Freeze Protection (RS2110 & RS3110)

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RS4000/5000/6000 Value Series

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Features Of RS4000, RS5000 And RS6000 Series Thermostats

- Pop-up Wizard
- Engineered *True Blue* backlight display
- Largest Temperature Display Character Size
- Soft Touch Keys
- Set-up Test Mode
- Auto Changeover
- Circulating Fan
- Low temperature Freeze Protection
- High Temperature Protection
- High / Low Temperature Limits
- Easy Change Battery Access

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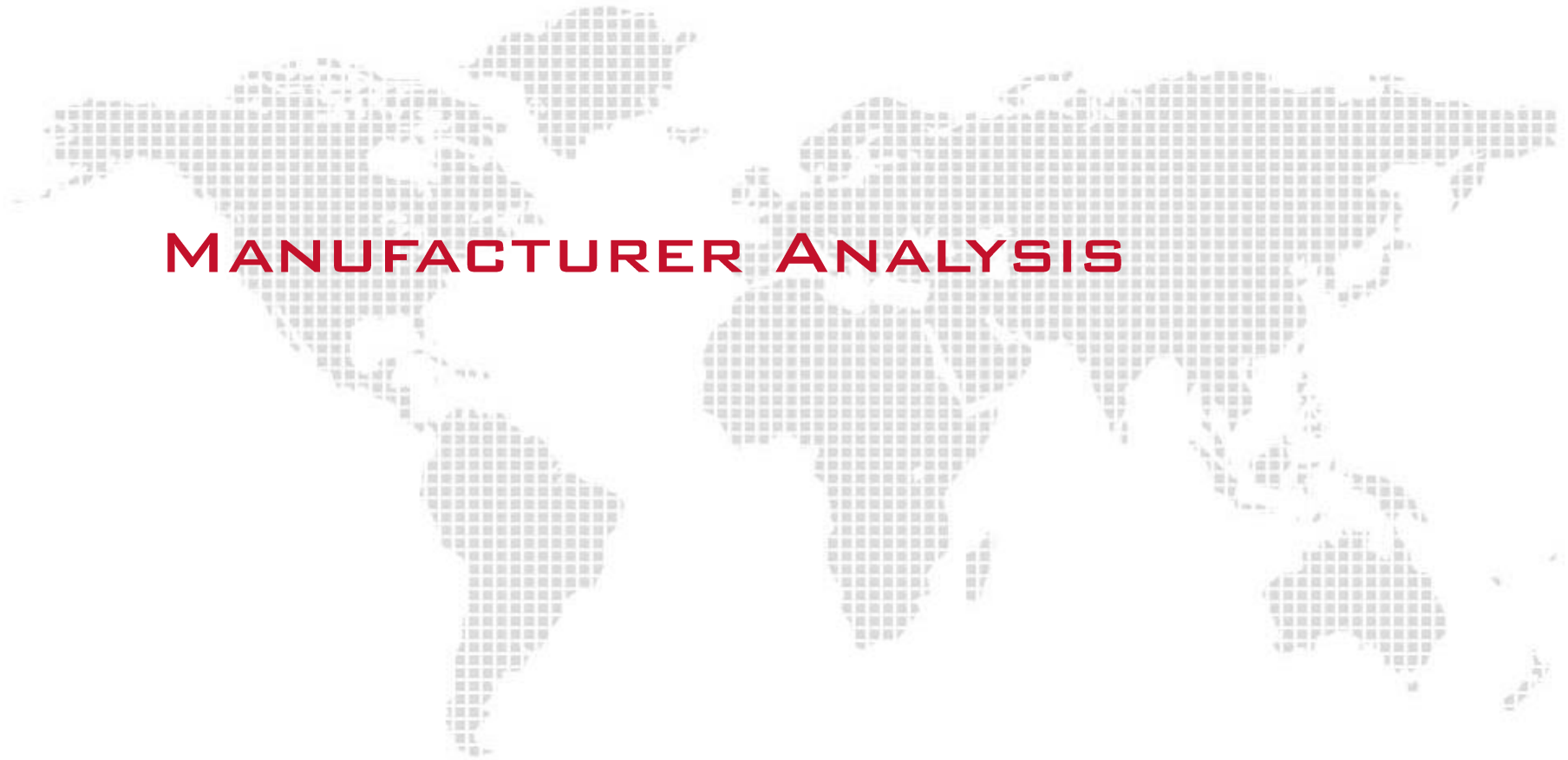
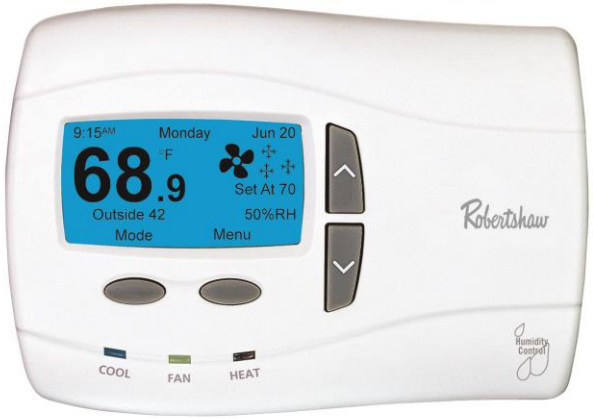
Manufacturer Analysis



Digital Versus Dot Matrix Display



i2 Series

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More Features + Less Cost = Value Series

RS456 Series

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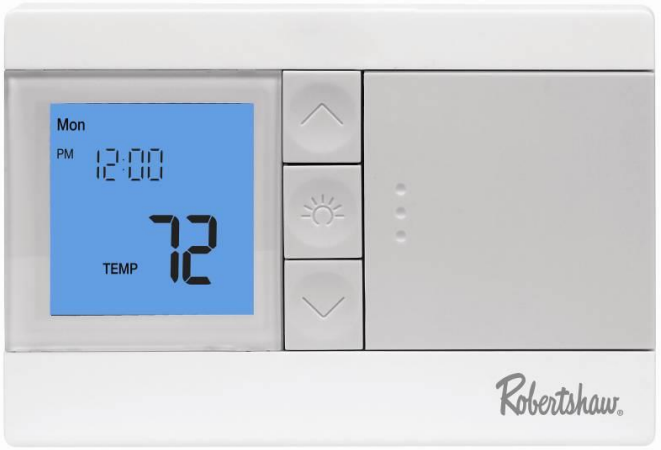
When Price Matters Economy Series

RS2000 Series

RS3000 Series



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Deluxe i2 - Manufacturer Comparison

Competitive Comparison	Robertshaw®	Honeywell	White Rodgers
Family Model or SKU	97xxi2 & 98xxi2	TH8000	1F90 Series
Menu-driven operation	**Yes**	**No**	**No**
High & Low Balance Points	**Yes**	**No**	**No**
True Time of Day Zoning	**Yes**	**No**	**No**
Trilingual Display	**Yes**	**No**	**No**
Integrated Contractor ID	**Yes**	**No**	**No**
Adjustable Differential	**Yes**	**No**	**No**

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Deluxe i2 - Pros and Cons

Pros and Cons	Invensys Controls	Competition
Menu-driven operation	Dot Matrix Display allows for common language programming, ease of use & installation	Requires special codes to be input for set-up and programming
High and Low Balance Points	Efficient & effective use of equipment	Higher utility bills
True Time of day Zoning	Effective solution to achieve comfort	Spend more for zoning
Trilingual Display	Greater Client flexibility & user friendliness	Static icons or word's
Integrated Contractor ID	Visual reminder for repeat service business	Longer lead times for special printing
Adjustable Differential	Control of Cycle Time	More energy costs because fixed

Deluxe i2 - Value Proposition

Value Proposition	Wholesaler / Distributor	Contractor	End-User
Menu-driven operation	Easier to sell	Easy Installation	Easier to Understand and use
High and Low Balance Points	More Features	More Control	Save energy costs
True Time of day Zoning	Upsell Zoning	Accuracy	Save energy costs
Trilingual Display	Meets wide range of clients	Flexibility	Easier to understand
Integrated Contractor ID	No additional SKU's to carry	Repeat business	Crisper, Cleaner appearance
Adjustable Differential	More Features	Flexibility and Control	Save Energy Costs

RS4000/5000/6000 Value Series – Manufacturer Comparison

Features	Robertshaw®	Honeywell	White-Rogers	Braeburn
Family Model or SKU	**RS4000/RS5000 RS6000**	**TH5000 TH6000**	**1F80 series**	**3000/5000**
Auto Changeover (All models)	Yes	Yes	Yes	Yes
Pop-Up Wizard Programming	Yes	No	No	No
Adj. High and Low Temp Limits	Yes	Yes	Yes	No
Circulating Fan	Yes	No	No	Yes
Universal Equipment and Power	Yes	Yes	Yes	Yes

RS4000/5000/6000 Value Series

Pros and Cons

Pros and Cons	Invensys Controls	Competition
Auto Changeover	Better comfort in Spring and Fall	More trips to the stat
Pop-Up Wizard Programming	Simplifies Start-up and Installation	Requires complicated codes
Adj. High and Low Temp Limits	Minimizes Temperature adjustments	Higher energy use
Circulating Fan	Effective use of IAQ equipment	Less use of IAQ equipment
Universal Equipment and Power	Battery or 24Vac Common, Gas, Electric, Oil, or Heat pump equipment	Requires separate SKU's

Robertshaw®

RS4000/5000/6000 Value Series

Value Proposition

Value Proposition	Wholesaler / Distributor	Contractor	End-User
Auto Changeover	Less SKU's on shelf	Less programming	Greater Comfort
Pop-Up Wizard Programming	Easier to sell	Faster Programming and Start-up	Set-up right the first time
Adj. High and Low Temp Limits	More Features	Offer greater Control	Minimizes Temperature Swings
Circulating Fan	Upsell other products	Better use of IAQ equipment	Comfort and Energy savings
Universal Equipment and Power	Less Inventory to Carry	Right Product for Right Job	Flexibility on new systems

Robertshaw®

RS2000/3000 Economy Series Manufacturer Comparison

Competitive Comparison	Robertshaw®	Honeywell	White/ Rodgers	Braeburn
Family Model or SKU	RS2000 / RS3000	TH1000 / TH2000 TH3000 / TH4000	1F70 series	1000 / 2000
Larger Display & Characters	**Yes**	**No**	**No**	**No**
Filter Monitor	**Yes**	**No**	**No**	**Yes**
Adj. Compressor Protection	**Yes**	**No**	**No**	**No**

RS2000/3000 Economy Series

Pros and Cons

Pro's and Con's	Invensys Controls	Competition
Larger Display & Characters	Easier to See and Read	Smaller Characters
Filter Monitor	Convenient Reminder	No indication of when to service equipment
Adj. Compressor Protection	Greater Flexibility for Equipment	Longer delays for testing

Robertshaw

RS2000/3000 Economy Series

Value Proposition

Value Proposition	Wholesaler / Distributor	Contractor	End-User
Larger Display & Characters	Easier to Sell	Easier to read & Set-up	Easier to read
Filter Monitor	More Features	Repeat Service Business	Cleaner & Healthier Air
Adj. Compressor Protection	More Features	Faster commissioning of system	Faster Installation

Robertshaw®

Troubleshooting Installation

Pop-Up Menu Configuration Chart

Displayed	Choice	Default
SCAL	F° or C°	F°
CLOC	12 or 24 hour	12
LITE	1=always on, 0=off	0
DIFF	Set Differential, 0.5-3 F° or 0.5-1.5 C°	1 F°
DIF2	Set 2nd Stage Differential, 1-6 F° or 0.5-3 C°	2 F°
DLY2	2nd stage time delay, 5-40 min	20
DLY3	3rd stage time delay, 5-40 min	20
AUTO	Enable Auto change over, Y = Yes, N = No	Y
DEDB	Deadband in Degree's, 1 – 8 F°	3 F°
HI	Upper heating limit, 45-90 F°	90 F°
LO	Lower Cooling Limit, 45-90 F°	45 F°
VAC HEAT	Vacation Heating Set point, 45-90 F°	60 F°
VAC COOL	Vacation Cooling Set point, 45-90 F°	85 F°
CHECK	Filter Monitor, hours, OFF – 9900	OFF
CYCL	Compressor Short Cycle Delay, minutes, 0 – 5	5
CAL	Temperature Calibration Offset, - 3 to 3 F°	0

Test Mode

- Press Fan and HEAT/COOL buttons together for 10 seconds

Test Mode

- Press FAN and HEAT/COOL buttons for 10 seconds
- Press the HEAT/COOL button to turn on heat. A second press will turn on 2nd stage of heat
- Continuous pressing of HEAT/COOL button will turn on cooling
- To exit the test mode for:
  - RS5000 and RS6000 series, push the START/STOP button
  - RS4000 series, push UP or DOWN
- 30-minute time out to place back into operation mode

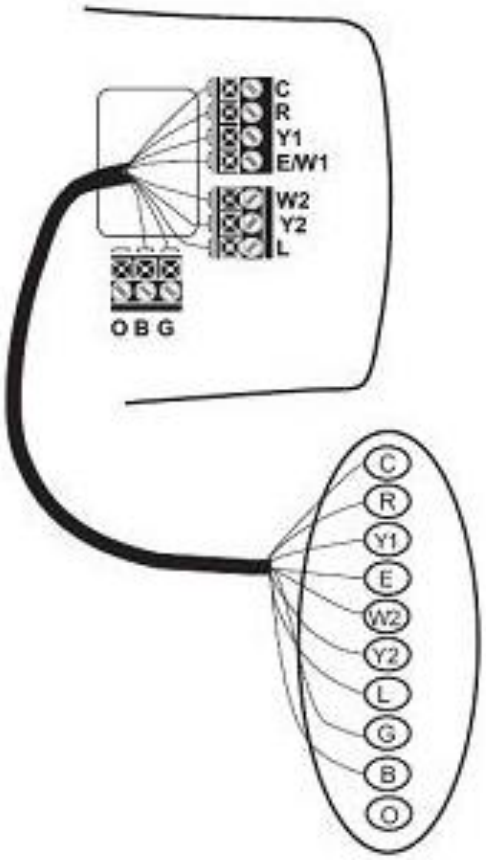
Access to Pop-Up Menu After Start up

- Press the UP and DOWN buttons simultaneously for 3 seconds
- Pop-Up Menu will initiate

Password Protection

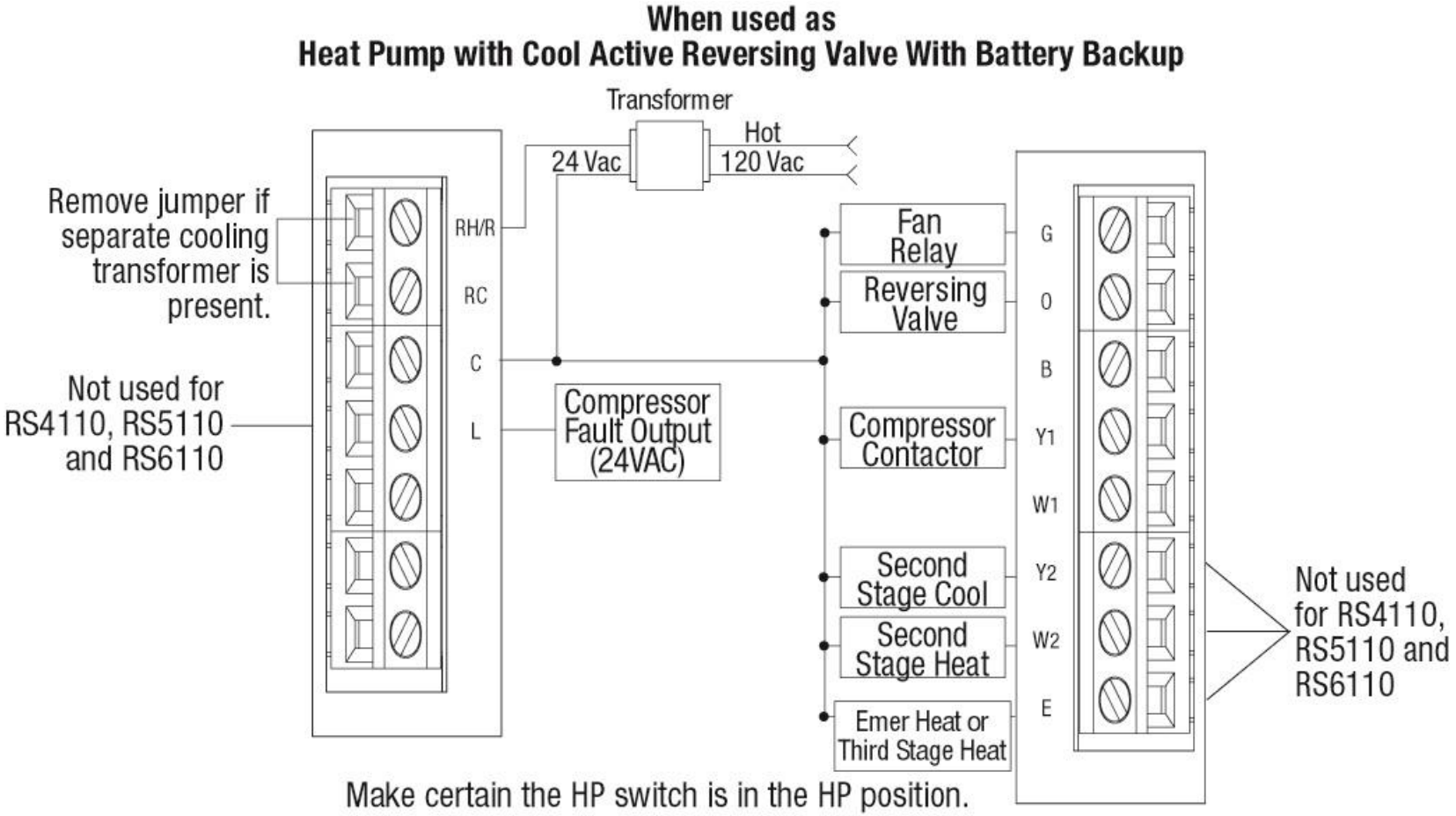
- Press DOWN and HEAT/COOL buttons simultaneously
  - Hold for 10 seconds
- A lock will appear in the
  - Upper left hand corner of the RS4000 series
  - Lower right hand corner of the RS5000 and RS6000 series
- Default password for *RS4000 is 81*
- Default password for *RS5000 & RS6000 is 8115*

I2 Connections



- C: 24 VAC Common
- R: 24 VAC
- Y1: 1st stage cooling
- E/W1: Emergency heat / 1st stage heating
- W2: 2nd stage heating
- Y2: 2nd stage cooling
- L: System fault indicator
- O: Cool active reversing valve
- B: Heat active reversing valve
- G: Fan

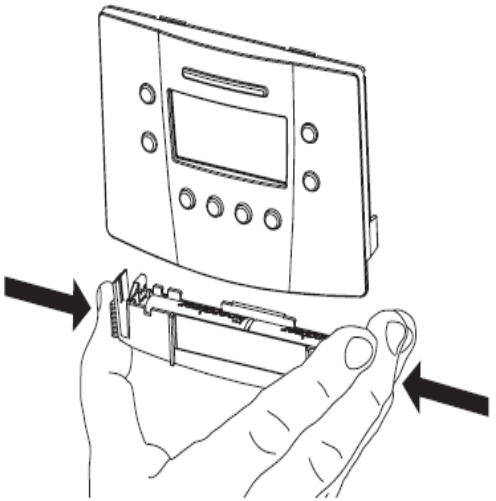
Wiring Diagram Including Heat Pump Switch



Installation – Powering Thermostat

Power may be provided by either (Dual Power)

- 24 VAC
- 2 (AA) Batteries
- Thermostats with batteries and powered by 24V AC will continue to function even if the 24V fails



Installing Batteries

- To open the battery tray, pinch both sides and pull tray out from bottom
- Install two AA batteries with polarity as shown inside the tray
- Slide the tray back into the body

Battery Charge Level

- LEVEL 1: The low battery icon
- LEVEL 2: The low battery icon will flash and not turn on

Robertshaw®

Troubleshooting Furnaces

- There is NO HEAT!

Switch on side of furnace

- ✓ Most furnaces will have an ON/OFF wall switch next to them

Fuses and/or circuit breaker

- ✓ Make sure fuses and/or circuit breaker have been checked

Front furnace cover

- ✓ Many furnaces will not operate with cover off

Furnace filter

- ✓ Make sure furnace filter is clean and clear

Troubleshooting Thermostats

- There is NO HEAT!

Thermostat settings

- ✓ Is thermostat in HEAT mode and calling for heat?

Wiring

- ✓ Is thermostat wired properly and is jumper there?

Relays (if applicable)

- ✓ Are relays clicking on a call for heat?

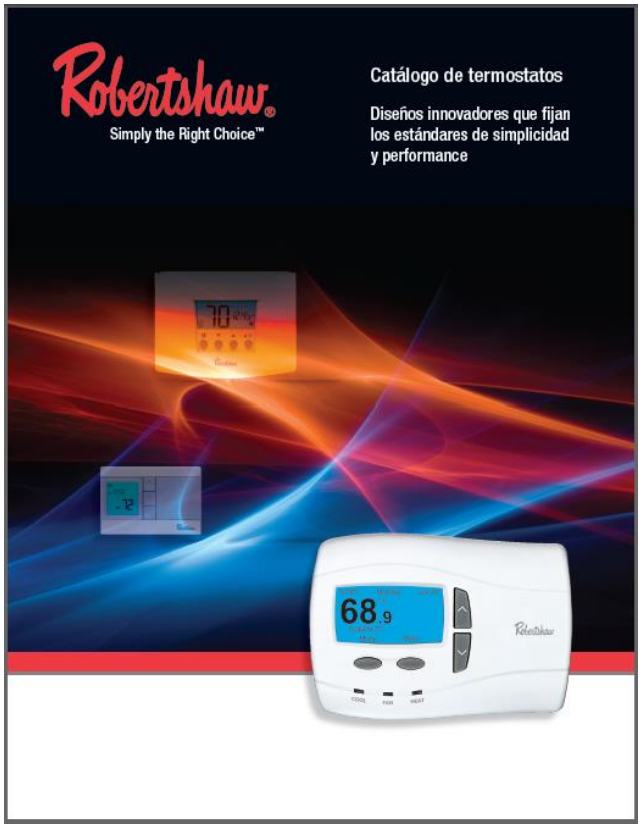
Jumping terminals

- ✓ Does furnace cycle if the Ground and W terminals are jumped?

- **NOTE:** Remember most all gas furnaces will run the inducer fan for a couple of minutes before the actual blower turns on. This inducer fan may not be heard if the furnace is in a remote location.

Sales Tools for Thermostats

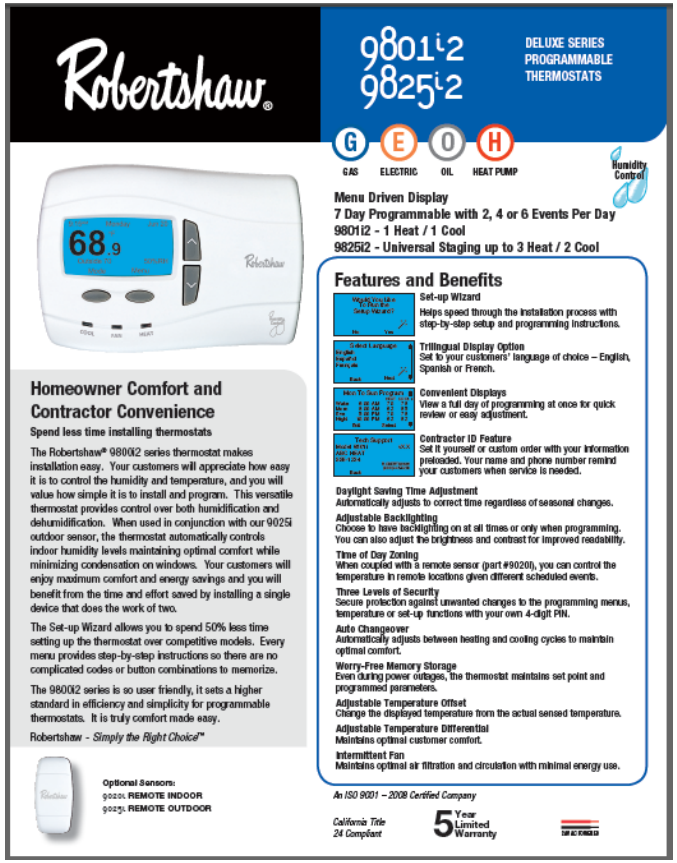
- Overview Catalog in Spanish…150-2284
- Thermostat Catalog in Spanish…150-2208



Sales Tools for i2 Series

- Order Sell Sheets 150-2317 and 150-2318

Robertshaw
9701i2
9725i2
DELUXE SERIES
PROGRAMMABLE
THERMOSTATS
G E O H
GAS ELECTRIC OIL HEAT PUMP
Menu Driven Display
7 Day Programmable with 2, 4 or 6 Events Per Day
9701i2 - 1 Heat / 1 Cool
9725i2 - Universal Staging up to 3 Heat / 2 Cool
Features and Benefits
Set-up Wizard
Helps speed through the installation process with step-by-step setup and programming instructions.
Trilingual Display Option
Set to your customers' language of choice – English, Spanish or French.
Convenient Displays
View a full day of programming at once for quick review or easy adjustment.
Contractor ID Feature
Set it yourself or custom order with your information pre loaded. Your name and phone number remind your customers when service is needed.
Daylight Saving Time Adjustment
Automatically adjusts to correct time regardless of seasonal changes.
Adjustable Backlighting
Choose to have backlighting on at all times or only when programming. You can also adjust the brightness and contrast for improved readability.
Time of Day Zoning
When coupled with a remote sensor (part #90206), you can control the temperature in remote locations given different scheduled events.
Three Levels of Security
Secure protection against unwanted changes to the programming menus, temperature or set-up functions with your own 4-digit PIN.
Auto Changeover
Automatically adjusts between heating and cooling cycles to maintain optimal comfort.
Worry-Free Memory Storage
Even during power outages, the thermostat maintains set point and programmed parameters.
Adjustable Temperature Offset
Change the displayed temperature from the actual sensed temperature.
Adjustable Temperature Differential
Maintains optimal customer comfort.
Intermittent Fan
Maintains optimal air filtration and circulation with minimal energy use.
Homeowner Comfort and Contractor Convenience
Spend less time installing thermostats
The Robertshaw® 9700i2 series thermostat makes installation easy. With our efficient and menu-driven Set-up Wizard, you can reduce installation time by 50% over competitive models. Every menu provides step-by-step instructions so there are no complicated codes or button combinations to memorize.
Programming is easier for your customers too. Menus are simple to follow. Plus, there are extra convenience features such as Automated Time adjustment for Daylight Saving Time, along with new indoor air quality reminders.
The 9700i2 series is so user friendly, it sets a higher standard in efficiency and simplicity for programmable thermostats. It is truly comfort made easy.
Robertshaw - Simply the Right Choice™
Optional Sensors:
90206 REMOTE INDOOR
90251 REMOTE OUTDOOR
An ISO 9001 – 2008 Certified Company
California Title 24 Compliant
5 Year Limited Warranty


Robertshaw
9801i2
9825i2
DELUXE SERIES
PROGRAMMABLE
THERMOSTATS
G E O H
GAS ELECTRIC OIL HEAT PUMP
Humidity Control
Menu Driven Display
7 Day Programmable with 2, 4 or 6 Events Per Day
9801i2 - 1 Heat / 1 Cool
9825i2 - Universal Staging up to 3 Heat / 2 Cool
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View a full day of programming at once for quick review or easy adjustment.
Contractor ID Feature
Set it yourself or custom order with your information preloaded. Your name and phone number remind your customers when service is needed.
Daylight Saving Time Adjustment
Automatically adjusts to correct time regardless of seasonal changes.
Adjustable Backlighting
Choose to have backlighting on at all times or only when programming. You can also adjust the brightness and contrast for improved readability.
Time of Day Zoning
When coupled with a remote sensor (part #90206), you can control the temperature in remote locations given different scheduled events.
Three Levels of Security
Secure protection against unwanted changes to the programming menus, temperature or set-up functions with your own 4-digit PIN.
Auto Changeover
Automatically adjusts between heating and cooling cycles to maintain optimal comfort.
Worry-Free Memory Storage
Even during power outages, the thermostat maintains set point and programmed parameters.
Adjustable Temperature Offset
Change the displayed temperature from the actual sensed temperature.
Adjustable Temperature Differential
Maintains optimal customer comfort.
Intermittent Fan
Maintains optimal air filtration and circulation with minimal energy use.
Homeowner Comfort and Contractor Convenience
Spend less time installing thermostats
The Robertshaw® 9800i2 series thermostat makes installation easy. Your customers will appreciate how easy it is to control the humidity and temperature, and you will value how simple it is to install and program. This versatile thermostat provides control over both humidification and dehumidification. When used in conjunction with our 9025i outdoor sensor, the thermostat automatically controls indoor humidity levels maintaining optimal comfort while minimizing condensation on windows. Your customers will enjoy maximum comfort and energy savings and you will benefit from the time and effort saved by installing a single device that does the work of two.
The Set-up Wizard allows you to spend 50% less time setting up the thermostat over competitive models. Every menu provides step-by-step instructions so there are no complicated codes or button combinations to memorize.
The 9800i2 series is so user friendly, it sets a higher standard in efficiency and simplicity for programmable thermostats. It is truly comfort made easy.
Robertshaw - Simply the Right Choice™
Optional Sensors:
90206 REMOTE INDOOR
90251 REMOTE OUTDOOR
An ISO 9001 – 2008 Certified Company
California Title 24 Compliant
5 Year Limited Warranty

Sales Tools for the Value Series

- Order Sell Sheets: 150-2089, 150-2090 and 150-2091

Robertshaw

RS4110
RS4220
RS4320

VALUE SERIES
DIGITAL NON-PROGRAMMABLE
THERMOSTATS

E G O H M
ELECTRIC GAS OIL HEAT PUMP MILLIVOLT

RS4110 – 1 Heat / 1 Cool
RS4220 – Universal Control up to 2 Heat / 2 Cool
RS4320 – Universal Control up to 3 Heat / 2 Cool

Comfort Control Made Simple

The Robertshaw® RS4000 thermostat family is *Simply the Right Choice*™ when it comes to automated temperature controls.

With the comfort, convenience, and efficiency features that homeowners and contractors want, the RS4000 family provides custom program options in value-packed thermostats for an affordable price.

- Quick connect wiring feature to save up to 15 minutes on every installation.
- Pop-up Wizard to customize thermostat settings with an instant start-up menu.
- Fully adjustable differentials to maintain optimal heating and cooling comfort year-round.

All RS4000 thermostats are fully compatible with all standard 24V AC heating and cooling systems. Additional compatibility with multi-stage gas/electric furnaces and heat pump systems are available in the RS4220 and RS4320 models.

Add in easy installation, Contractor ID option, and quality you can depend on, and you have the Robertshaw RS4000 thermostat family - *Simply the Right Choice.*

Features and Benefits

Universal Control up to 2 Heat / 2 Cool – RS4220 only
Universal Control up to 3 Heat / 2 Cool – RS4320 only
Operates on both multi-stage gas/electric furnaces and heat pumps means less inventory.

Auto Changeover
Switches automatically between heating and cooling for constant home comfort.

Pop-Up Wizard
Launches instant installation menu to quickly enter the settings for programmed thermostat functions.

Bigger Brighter Backlight with Nightlight Option
Makes viewing and setting the temperature easier any time of the day.

Worry-Free Memory Retention
Maintains set point and programmed parameters, even during power outages.

Easy Change Battery Access
Provides drop down removable compartment for quick battery replacement.

Circulating Fan
Maintains optimal air circulation between demand cycles for improved comfort with minimal energy use.

Low Temperature Freeze Protection
Turns on heat automatically when temperature goes below 41°F. Protects pipes from freezing.

Adjustable Temperature Differential and Upstaging
Provides for full selection of parameters to deliver maximum comfort or energy savings.

High and Low Setpoint Limits
Protects the heating and cooling systems by limiting temperature settings.

An ISO 9001 – 2000 Certified Company

5 Year Limited Warranty - OR - BATTERY

Robertshaw

RS5110
RS5220

VALUE SERIES
DIGITAL PROGRAMMABLE
THERMOSTATS

E G O H M
ELECTRIC GAS OIL HEAT PUMP MILLIVOLT

5 - 2 Day Programmable
RS5110 – 1 Heat / 1 Cool
RS5220 – Universal Control up to 2 Heat / 2 Cool

Comfort Control With Energy Savings

The Robertshaw® RS5000 thermostat family is *Simply the Right Choice*™ when it comes to programmable temperature controls that can save energy and money.

With the comfort, convenience, and efficiency features that homeowners and contractors want, the RS5000 family provides EnergyStar® and California Title 24 compliant features for an affordable price.

- Fully programmable with soft touch keys to easily set four events per day AND 5-2 day scheduling.
- Pop-up Wizard to customize thermostat settings with an instant start-up menu.
- Vacation setpoint override to reduce energy use while away from home.

The RS5000 thermostats are fully compatible with all standard 24V AC heating and cooling systems. Additional compatibility with multi-stage gas/electric furnaces and heat pump systems is available in the RS5220 model.

Add in easy installation, Contractor ID option, and quality you can depend on, and you have the Robertshaw RS5000 thermostat family - *Simply the Right Choice.*

Features and Benefits

Universal Control up to 2 Heat / 2 Cool – RS5220 only
Operates on both multi-stage gas/electric furnaces and heat pumps means less inventory.

Auto Changeover
Switches automatically between heating and cooling for constant home comfort.

Pop-Up Wizard
Launches instant installation menu to quickly enter the settings for programmed thermostat functions.

Bigger Brighter Backlight with Nightlight Option
Makes viewing and setting the temperature easier any time of the day.

Worry-Free Memory Retention
Maintains set point and programmed parameters, even during power outages.

Easy Change Battery Access
Provides drop down removable compartment for quick battery replacement.

Circulating Fan
Maintains optimal air circulation between demand cycles for improved comfort with minimal energy use.

Low Temperature Freeze Protection
Turns on heat automatically when temperature goes below 41°F. Protects pipes from freezing.

Adjustable Temperature Differential and Upstaging
Provides for full selection of parameters to deliver maximum comfort or energy savings.

High and Low Setpoint Limits
Protects the heating and cooling systems by limiting temperature settings.

An ISO 9001 – 2000 Certified Company

5 Year Limited Warranty - OR - BATTERY

Robertshaw

RS6110
RS6220
RS6320

VALUE SERIES
DIGITAL PROGRAMMABLE
THERMOSTATS

E G O H M
ELECTRIC GAS OIL HEAT PUMP MILLIVOLT

7 Day Programmable
RS6110 – 1 Heat / 1 Cool
RS6220 – Universal Control up to 2 Heat / 2 Cool
RS6320 – Universal Control up to 3 Heat / 2 Cool

Seven Day Comfort Control Simplified

The Robertshaw® RS6000 thermostat family is *Simply the Right Choice*™ when it comes to daily programmable temperature controls that can save energy and money.

With the comfort, convenience, and efficiency features that homeowners and contractors want, the RS6000 family provides EnergyStar® and California Title 24 compliant features for an affordable price.

- Fully programmable with soft touch keys to easily set four events per day AND 7 day scheduling.
- Copy command that makes programming simple to set up and flexible to use.
- Pop-Up Wizard to customize thermostat settings with an instant start-up menu.

The RS6000 thermostats are fully compatible with all standard 24V AC heating and cooling systems. Additional compatibility with multi-stage gas/electric furnaces and heat pump systems are available in the RS6220 and RS6320 models.

Add in easy installation, Contractor ID option, and quality you can depend on, and you have the Robertshaw RS6000 thermostat family - *Simply the Right Choice.*

Features and Benefits

Universal Control up to 2 Heat / 2 Cool – RS6220 only
Universal Control up to 3 Heat / 2 Cool – RS6320 only
Operates on both multi-stage gas/electric furnaces and heat pumps means less inventory.

Auto Changeover
Switches automatically between heating and cooling for constant home comfort.

Pop-Up Wizard
Launches instant installation menu to quickly enter the settings for programmed thermostat functions.

Bigger Brighter Backlight with Nightlight Option
Makes viewing and setting the temperature easier any time of the day.

Worry-Free Memory Retention
Maintains set point and programmed parameters, even during power outages.

Easy Change Battery Access
Provides drop down removable compartment for quick battery replacement.

Circulating Fan
Maintains optimal air circulation between demand cycles for improved comfort with minimal energy use.

Low Temperature Freeze Protection
Turns on heat automatically when temperature goes below 41°F. Protects pipes from freezing.

Adjustable Temperature Differential and Upstaging
Provides for full selection of parameters to deliver maximum comfort or energy savings.

High and Low Setpoint Limits
Protects the heating and cooling systems by limiting temperature settings.

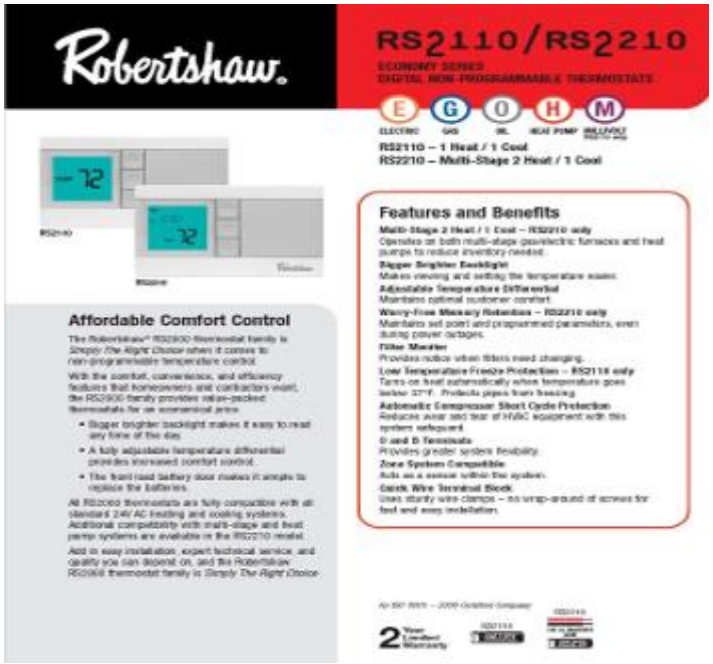
An ISO 9001 – 2000 Certified Company

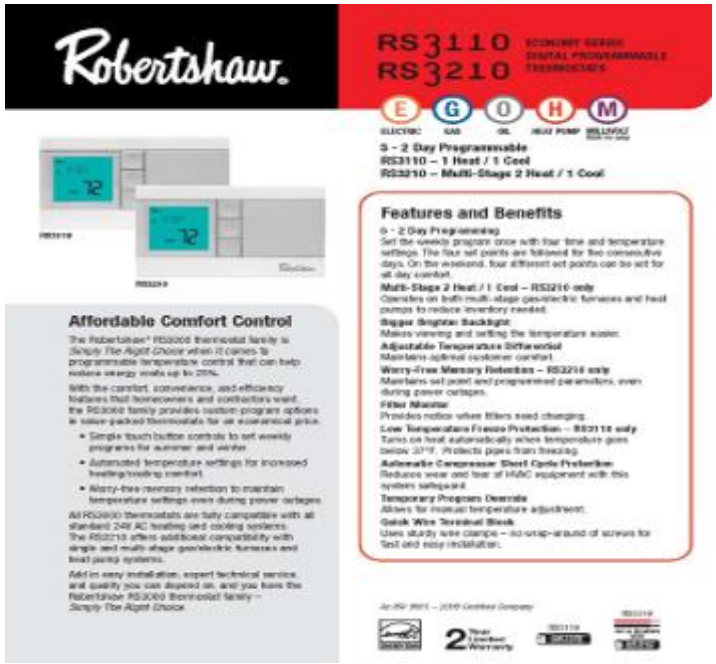
5 Year Limited Warranty - OR - BATTERY

Robertshaw

Sales Tools For Economy Series

- Order Sell Sheets: 150-2080 & 150-2082





Poll Question #1

What is activated when UP and DOWN buttons are pushed simultaneously for 10 seconds?

a) Password Setup
b) System Test Mode
c) Pop-Up Menu
d) Auto changeover

Poll Question #2

Robertshaw® RS456 Series Wall Thermostats are powered by:

a) 24 Volts AC and/or AA Batteries
b) Line Voltage and/or AAA Batteries
c) Line Voltage only
d) Batteries only

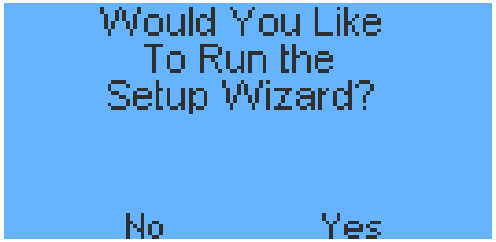
Hands-on Lab - Thermostats

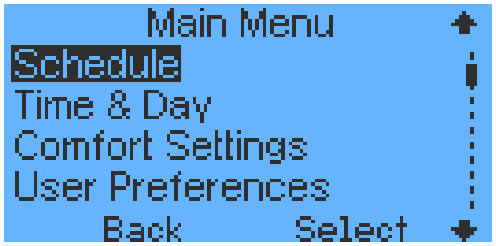
i2 series wall thermostat

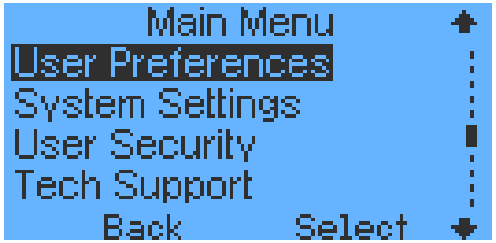
Robertshaw

i2 setup and go Lab

- Setup Wizard
- Language
- Time and Date
- Time Format (12 or 24 hours)
- Auto Adjust Daylight Savings Time
- Temperature Scales (°C or °F)
- Set Schedule
- Comfort Settings for cost savings
  - Differential
  - Energy Efficient Recovery
  - Fan Settings
- User Preferences
  - Display Setting
  - Indoor Air Quality



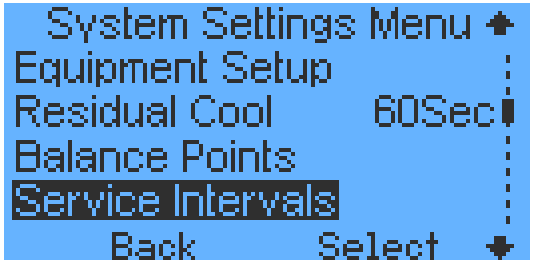


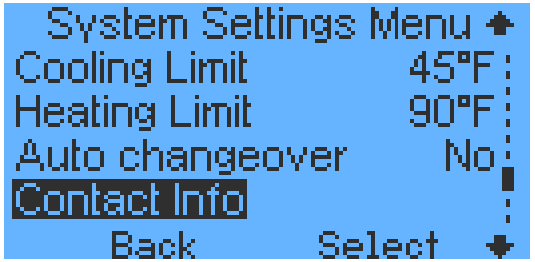


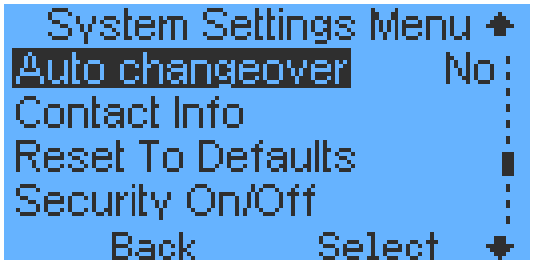
i2 setup and go Lab

System Settings

- Equipment Setup
  - Residual cooling
  - Balance points
  - Limits
  - Auto changeover
  - Contacts
- User Security (code is 4199)
  - System security
  - Program lockout
  - Temporary setting lockout



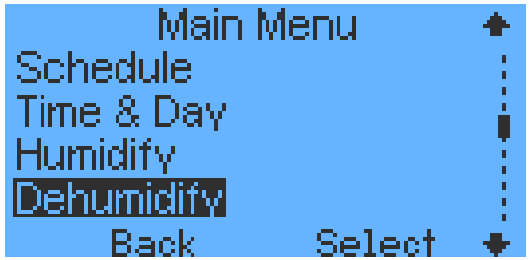


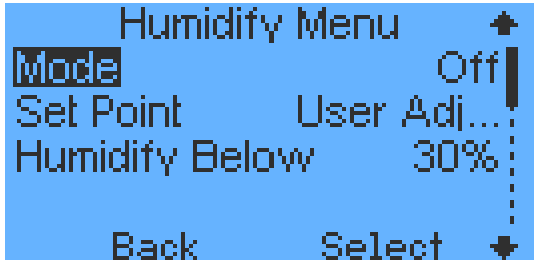


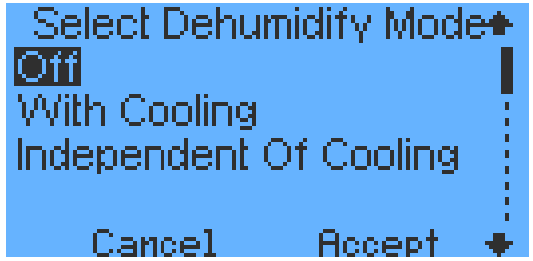
Robertshaw

i2 setup and go Lab

- Humidity (9800 series only)
- Dehumidity (9800 series only)
- Set Relative Humidity %

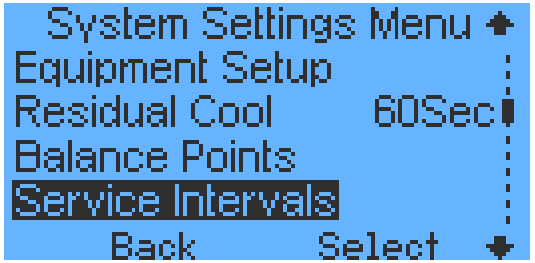


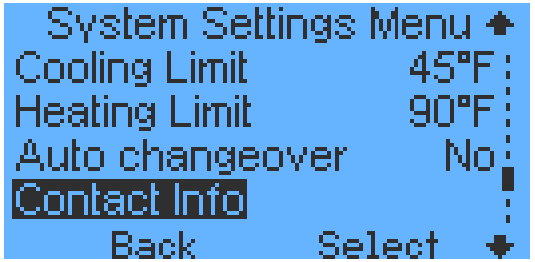


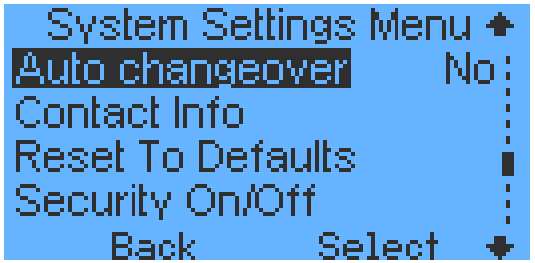


i2 Setup and Go Lab

- 1st Stage Heat Equipment
  - None, Furnace, Strip or Heat pump
- 2nd Stage Heat Equipment
  - None, Furnace, Strip or Heat pump
- Enable Auto Changeover?
- Service Reminders
  - Heat System
  - Cool System
  - Filter
  - UV Light
  - Humidifier Pad
- Edit Contractor Information







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i2 Lab Additional Settings

Exercise 1

- 12 hour, F, 1 Heat/1 Cool, Strip heat
- Fan ON continuous

Exercise 2

- 24 hour, C, 2 Heat/ 2 Cool, Heat Pump, Furnace
- Fan ON 10 min, Fan OFF 20 min

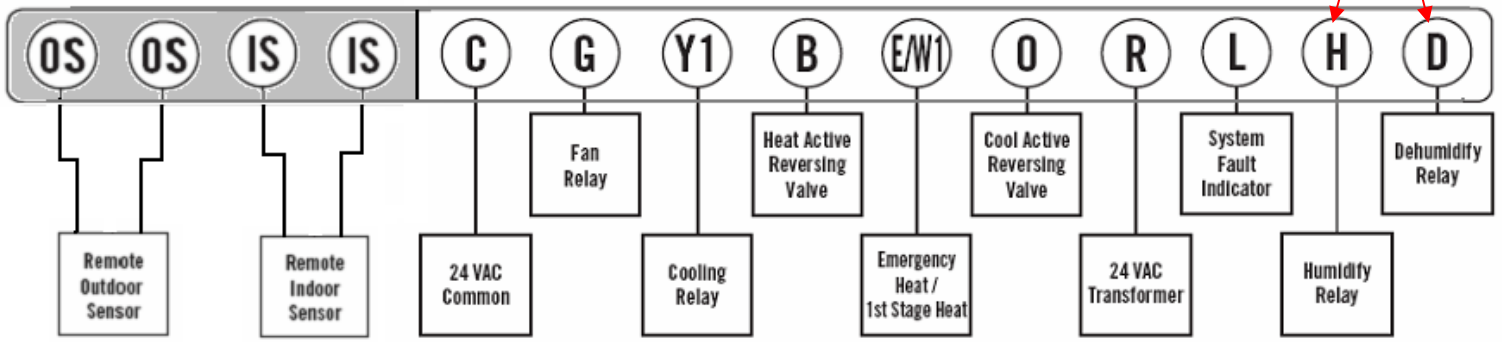
Exercise 3

- Change contractor information to following:
- Robertshaw Tech, 800-445-8299

i2 Series Terminal Designations

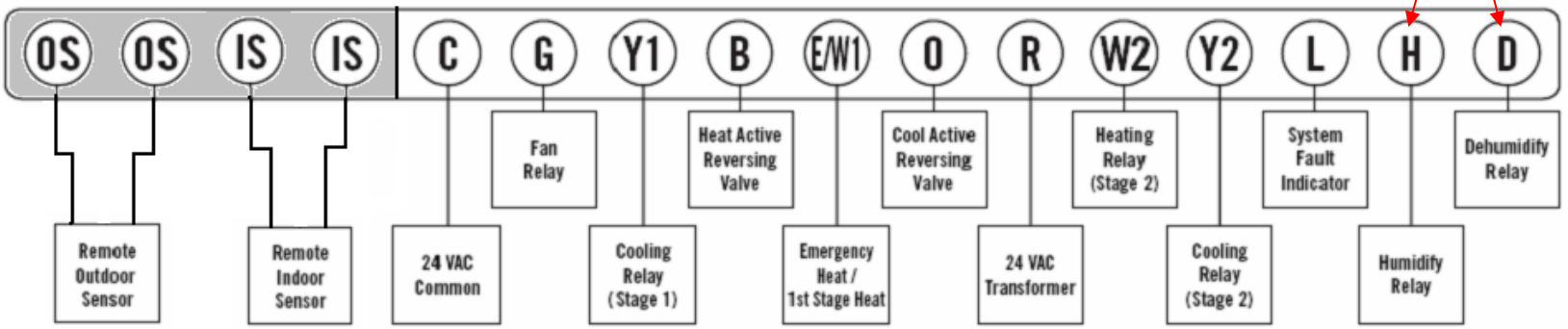
9701i2 same except

9801i2 Wiring



9725i2 same except

9825i2 Wiring



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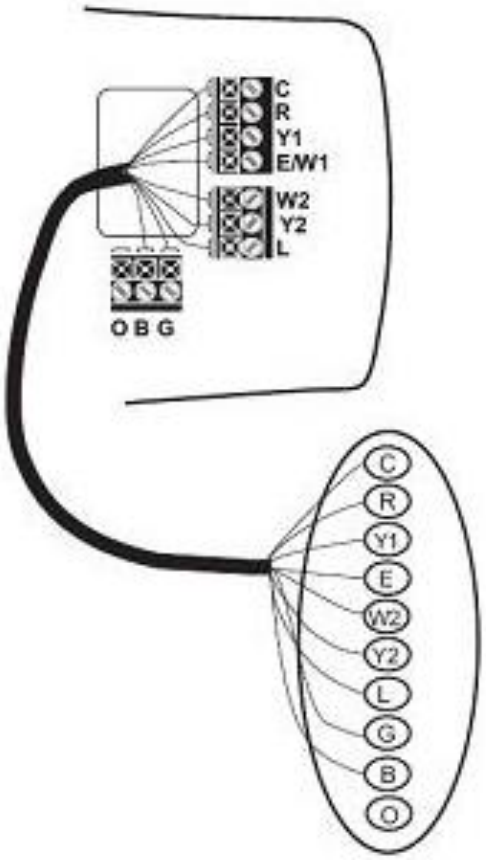
I2 lab Connections



- C: 24 VAC Common
- R: 24 VAC
- Y1: 1st stage cooling
- E/W1: Emergency heat / 1st stage heating
- W2: 2nd stage heating
- Y2: 2nd stage cooling
- L: System fault indicator
- O: Cool active reversing valve
- B: Heat active reversing valve
- G: Fan

When You Have Uni-Line® Questions

Telephones:

Technical Service	**1-800-445-8299**
Technical Service Fax	**1-630-260-7294**
Customer Service	**1-800-304-6563**
Customer Service Fax	**1-800-426-0804**

Websites:

Uni-Line® Catalog: www.Uni-Line.com

Cross Reference: www.uni-line.com/modules/xref/xrefsearch.aspx

Toolbox: www.ToolBox.InvensysControls.com

General Information for:

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Questions and Answers?